

WE CLAIM AS OUR INVENTION:

1. A medical device comprising:
a cuff adapted for positioning in the trachea of a subject with a patient tube;
a first tube having a first end in fluid communication with an interior of the cuff
and having an opposite, second end;
a second tube having a first end in fluid communication with the interior of the
cuff and having an opposite, second end;
a pumping device connected to the respective second ends of the first and
second tubes for circulating a fluid through the interior of the cuff; and
said cuff having a membrane that is permeable to a specific substance, said
membrane being disposed to allow transfer of said specific substance
between the interior of the cuff and an exterior of the cuff.
2. A medical device as claimed in claim 1 wherein said pump, said first
and second tubes, and said cuff form a flow path for said fluid, and wherein said
medical device comprises an analysis unit in fluid communication with said flow path
for analyzing said fluid with regard to content in said fluid of said specific substance.
3. A medical device as claimed in claim 2 wherein said analysis unit
includes a calculation unit that quantitatively determines an amount of said specific
substance in said fluid relative to a predetermined normal amount.
4. A medical device as claimed in claim 1 wherein said pumping device,
said first and second tubes, and said cuff form a flow path for said fluid, and wherein
said medical device comprises a dosing unit in fluid communication with said flow
path for administering a dose of a medicament into said fluid.

5. A medical device as claimed in claim 4 wherein said dosing unit comprises at least one reservoir for at least one additive substance for inclusion in said medicament.

6. A medical device as claimed in claim 1 wherein said cuff comprises at least one partition wall that partitions the interior of said cuff into multiple chambers, each chamber having a first chamber tube with a first chamber tube end in fluid communication therewith and a second chamber tube with a first chamber tube end in fluid communication therewith, and wherein said first chamber tube has a second chamber tube end and said second chamber tube has a second chamber tube end in fluid communication with said pumping device for circulation of respectively separate fluids through the multiple chambers.

7. A medical device as claimed in claim 1 wherein said membrane is permeable to at least one protein, as said specific substance, selected from the group of proteins consisting of SP-A, SP-B, SP-C and SP-D that are present in surfactant.